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We claim:

1. A method for enhancing plant growth or yield, comprising exposing soil to H₂ gas, and growing a plant in the soil.

5 2. The method of claim 1, further comprising combining the soil exposed to H₂ with soil not exposed to H₂, and growing the plant in the thus combined soil.

3. The method of claim 2 wherein the amount of the combined soil which is the soil exposed to H₂ is between about 5% and 100%, by volume.

4. The method of claim 1, wherein the soil exposed to H₂ is combined with soil in which the plant is already growing.

10 5. The method of claim 1, wherein a seed or plant is planted in soil not exposed to H₂, adjacent a volume of the soil exposed to H₂.

6. The method of claim 1, wherein the soil exposed to H₂ is soil in which the plant is already growing.

15 7. The method of claim 1, wherein the H₂ gas is generated by the electrolysis of water.

8. The method of claim 7, wherein the H₂ gas is generated by providing an electrical current in the soil so as to generate H₂ directly within the soil.

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9. The method of claim 1, wherein the H₂ gas is generated by H₂ evolving microorganisms.

20 10. The method of claim 9, wherein the H₂ evolving microorganisms are also N₂ fixing microorganisms.

11. The method of claim 1, wherein the H₂ gas is provided by a legume selected for its

ability to produce H₂ gas.

12. The method of claim 11, wherein the legume has HUP- symbiotic nitrogen-fixing bacteria.

5 13. The method of claim 11, wherein the legume has inefficient nitrogen-fixing bacteria.

14. The method of claim 11, wherein the legume has distributed nodulation.

15. The method of claim 11, wherein the legume has an enhanced number of nodules.

16. The method of claim 1, further comprising placing the soil in a container that minimizes the diffusion of H₂ therefrom, and applying H₂ to the soil in the container.

10 17. The method of claim 1, further comprising covering the soil with a membrane having a low permeability to H₂, and providing H₂ below the membrane, wherein at least a portion of the exposure of the soil to H₂ occurs beneath the membrane.

18. The method of claim 1, wherein the H₂ gas is provided to the soil via tubing or hollow probes placed in the soil.

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B 1 19. A method for enhancing plant growth or yield, comprising:
obtaining a soil sample; and
exposing the soil sample to H₂ gas;
wherein said exposure of soil to H₂ enhances the ability of soil microorganisms to oxidize H₂; and

20 wherein said enhanced ability of the soil microorganisms potentiates enhanced growth or yield of a plant growing in said soil.

20. The method of claim 19, further comprising:
isolating the microorganisms, and

applying the microorganisms to soil, seeds, or plant roots;
wherein said application of microorganisms potentiates enhanced growth or yield
of a plant.

21. The method of claim 20, further comprising culturing said microorganisms and
5 applying the microorganisms to soil, seeds, or plant roots.

22. A method for enhancing plant growth or yield, comprising exposing soil to H₂ gas, obtaining an extract of the soil exposed to H₂ gas, and applying the extract to seeds, plant roots, or soil.

23. The method of claim 22, wherein the extract is an aqueous extract.

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